

Guest Editorial

AUTOMATED MICROWAVE MEASUREMENTS

In the last decade almost all electrical measurements have been automated, computerized, or made obsolete by such changes. Microwave measurement techniques I taught ten years ago, using slotted lines, are almost a forgotten art. Users today are not buying much non-automatic equipment for microwave measurements. I do not wish to imply that nonautomatic laboratory measurements are not of value, only that time and money does not allow such time-consuming methods to be used. The network analyzer, impedance plotter, antenna pattern recorders, and similar devices controlled by minicomputers have changed the microwave measurement techniques so that special training courses have had to be given to instruct engineers to use these new modern techniques.

I was pleased with the response of authors for this special issue, and I know that much more remains to be published. It is hoped that the microwave engineers will publish a special issue again in the near future describing such things as automatic diode measurements for microwaves and automatic programming techniques for the network analyzer. At one time, Hewlett-Packard proposed having special seminars by the owners of computer controlled network analyzers (this list of owners reads like a who's who in the microwave industry). The

exchange of programming software and special hardware circuits among these owners would be invaluable and save many of the newcomers the time required for such innovations. However, it is hard to get competitors to exchange trade secrets.

The Future

Why automation? The microwave industry is required more than ever before to build over wider and wider bands, more and more complicated switching and amplifying devices. The test time alone would run hours if automation was not employed. Inspection and evaluation of the test data would require even more time if the computer did not aid in screening by rejecting units out of specifications or indicating when units fail to switch or meet linearity requirements. Phase shifter modules are required to have tests performed at many phase states and over wide frequency bands, and therefore require special programmable test equipment to be assembled.

I predict the trend to continue and I will not be surprised if, ten years from today, the equipment we now use is obsolete and newer techniques are employed.

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From 1948 to 1953 he was with the Radio Research Division of Western Union Telegraph Company. From 1953 to 1955 he was Chief Engineer of Frequency Standards, Inc., and from 1955 to 1966 he was a member of the Technical Staff of Bell Telephone Laboratories. In August 1966 he joined the Semiconductor Division of Microwave Associates, Inc., Burlington, Mass., as a Senior Engineer, and since 1969 he has been Manager of the Computer Science Department.